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Barriers of the Use of ICT in Teaching: Mont-Amba Educational Province Solutions

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Abstract

The accelerated advancement of the technological revolution in the new digital world forces teachers to adapt and renovate their teaching practice by using information and communication technologies in the usual way so that this innovation improves the quality of the teaching and learning for skills development through the effective use of these technologies. Thus, teachers face many challenges when trying to integrate technology into their classrooms. Teachers from the Mont-Amba Educational Province, for example, are not spared from the many obstacles they face to use technologies in teaching and learning. It is within this framework that this research has set itself the main objective of investigating the challenges of using ICT in teaching and learning in order to propose solutions to improve the practices of teaching and learning in elementary schools in the educational province of Mont-Amba.

The research used a descriptive statistical analysis based on a mixed approach, and a conceptual framework was developed to guide the research. The sample of the target population is composed of 80 Teachers and 5 Head Teachers; two instruments, questionnaire and interview, are used to collect data. Qualitative data were analyzed by

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SPSS, and qualitative data were coded and analyzed. After analyzing the data, the result reveals that teachers face several challenges, such as lack of effective training, lack of resources, lack of time, lack of technical support and leadership, lack of knowledge and skills, lack of internet, lack of electricity, technical breakdown, low government funding, and lack of an effective strategy of ICT use in teaching and learning.

Originality or value: this study is very significant at two levels. First, in the scientific context, it contributes to the scientific literature on the use of ICTs in education. Secondly, it clarifies the barriers to the use of ICT in primary school teaching and learning that teachers face, and this study has developed a series of recommendations that will be presented to the government and the administrative authorities of the Congolese education sector so that it applies to meet these different challenges in the use of ICT in this educational province.

Key Words: ICT, Challenges, Obstacles, Teaching, Learning

1. Introduction

Primary education is the largest sub-sector of any education system and offers a unique opportunity to contribute to the transformation of our societies through the education of our young people; In order for these young people to adapt and compete in the world's fast-changing environment, children need more basic skills, including communication, problem-solving and analytical skills (creativity, flexibility, mobility, entrepreneurship etc.); Thus, an educational strategy should focus on the new lifestyle concept and skills development corresponding to current technological innovations Ivan Kala, et al., 2012).

Admittedly, by the great expansion and usefulness of the digital technologies that have proved throughout the world by its significant contribution in several fields, especially in education, the

Congolese education system cannot remain on the sidelines of this technological evolution, the Congolese government had decided in recent years to integrate ICT in the Congolese education system to offer all educational actors, ICT skills to adapt to the current digital world. The quality of education depends on the qualities and abilities of teachers (Stronge, 2007) because well-trained and competent teachers can exceptionally pass on their best knowledge to their students. The process is already underway, which is the reform of the Congolese education system, integrating ICT into teaching and learning, given the opportunities and benefits that these technologies offer in the field of education.

In addition, although ICT tools are becoming increasingly popular, many teachers still face enormous challenges in effectively integrating these new ICT tools into their teaching practices, so it is necessary for researchers to conduct studies to address all the challenges of using ICT in teaching and learning to effectively contribute to the successful use of ICT in educational activities. In today's Digital World, the use of ICT tools effectively contributes to the quality of teaching and learning. This study is conducted on the challenges of using ICT in teaching and learning at the primary school of Mont-Amba Educational Province in order to meet all the challenges to contribute to the effective integration ICT.

2. Material and Methods

This study used a descriptive statistical analysis based on the mixed approach. The mixed methodology allows for a strategic cohabitation of qualitative and quantitative data, in a coherent and harmonious way, in order to enrich the results of the research. This approach is essential for this study because it gives a detailed understanding of the problem of this study and guarantees a good interpretation.

It is important to specify the target population for the study because it helps the researcher make sampling decisions and resources to use (Orodho, 2008). This study was conducted in five public

primary schools in the educational province of Mont-Amba. They were selected using the simple random sampling technique; the respondents of this research are the teachers and head teachers of these five schools which make a total of 104target population (99Teachers and 5 Head teachers). Regarding the selection of teachers participating in this study, each Head teacher was responsible for randomly selecting teachers who participated in this research.

We used the formula of Yamane (1967) to identify the appropriate total of the sample of teachers who participated in this study. The following formula is reliable at a deviation factor of 95% and is less than 5%. The Formula is figured as:

n=N/ [1+N (e) 2], where:
e=deviation of sampling, N=size of population,
N=size of sampling,
Formulation:
n=104/ [1+ 104 X (0.05)2] = 104/ [1+90(0.0025)] = 104/1+0.225= 104/1.225= 84.89 = 85

2.1. Research Instruments

In this research, two instruments were used to collect the data from the respondents; this is the semi-structured interview and the questionnaire. It should be noted that the survey for collecting data was made between October 2018 and march 2019.

On one hand, The questionnaire, addressed for teachers, was composed of open questions, closed and multiple choice answers: (e.g. A) Never, B) Rarely, C) Sometimes, D) Often, and E) Always; A) No, B) Good, C) Very Good and D) Excellent); this questionnaire is subdivided into six sections: Participant information's (Gender, Age group, Educational level, Function and Educational Province), Infrastructure, Knowledge and Skills of ICT Use, Training in the Use of ICT, Barriers, and Challenges of Using ICT in Teaching and Learning, and the suggestions section which allowed respondents to

submit to the researcher their suggestions for facilitating the effective use of ICTs in teaching and learning.

The notions of reliability and validity are essential to the evaluation of the quality of the survey data. Determining the reliability and validity of the data is a very technical operation essential to the evaluation of relevance. However, the researcher developed a survey questionnaire that was tested, re-tested, and checked several times during the elementary phase before to be used during the pilot phase of the program research, which is the phase of collecting data from the targeted respondents for this research.

To determine the internal consistency of the questionnaire elements, the reliability test was performed using the Cronbach Alpha reliability test Cronbach's alpha coefficient was 0.966, indicating that the variables observed had excellent internal consistency.

Validity serves to explain to what extent the survey data are relevant to the conclusion, sufficiently precise and complete to support the conclusion. This tool was able to collect reliable data from the respondents that the research had targeted and all data were provided without any pressure and freely by the teacher respondents of the primary schools of the educational province of Mont-Amba.

On the other hand, the semi-structured interview was used to collect data from the heads teachers. This semi-structured interview guided some of the interviewees' comments on the various points that the researcher had anticipated in an interview guide, and an interview sheet was prepared to write all the answers provided by the interviewee. The questions used in the interviews were based on the infrastructure and obstacles/challenges of using ICTs in teaching and learning in his schools. They were selected to participate in this study because they are senior school officials who may have other data to provide to the researcher to enrich this research, but the main respondents are the teachers because they are the ones who face the challenges every day in their profession.

3. Results and discussion

In qualitative data analysis, above all, collected data has been identified, classified, coded and analyzed. As proposed by Glaser and Strauss (1967), the theoretically based analysis begins by "coding each incident in the data into as many categories of analysis as possible" as categories appear or emerge and the data correspond to an existing category ".

In addition, Quantitative data collected from respondents using the questionnaire were analyzed using Statistical Package for Social Sciences (SPSS) version 23 to calculate the Mean, and Standard deviation, and Microsoft Excel 2010 to design the graphs. The data analysis was based on descriptive statistics. This technique allowed the researcher to calculate the frequencies, means, standard deviation and percentages of the collected data that were summarized using graphs and tables for ease of interpretation; the data are: the demographic characteristics of the respondents, the level of knowledge and ICT skills, training in the use of ICT, challenges and obstacles encountered in the use of ICT in teaching and learning in primary school. All data provided by respondents were anonymously processed.

3.1. Demographic information of the respondents

The total number of respondents in the study was 80 teachers and 5 head teachers, 45 of whom were Male (52.94%) and 40 respondents were Female (47.06%), which is a percentage total respondents 100%.

3.2. Educational level of respondents

The educational level of the respondents in this study was subdivided into three levels of education: 71 respondents had the level of education of a State Diploma (83.5%), 9 respondents had a university level of Undergraduate (10.5%) and 5 respondents had a Bachelor's degree (6%). This shows that the majority of respondents

had a state diploma that is officially a required level of education for a primary school teacher in the Democratic Republic of Congo, and the university diploma (Undergraduate or Bachelor) is obligated to any head teacher of a primary school.

3.3. Participants' Schools Infrastructure Situation

Teachers and Head teachers provided information on the resources of their schools:

- 68 Teachers and 4 Head Teachers (84.7%) indicated that their classrooms are not equipped with computers while 12 teachers and 1 Head teachers (15.3%) indicated that their classrooms are equipped with computers. We found that the majority of respondents have a lack of computers which will not allow using ICT in their schools, this is considered a challenge.
- All 80 teachers and 5 Head teachers (100%) indicated that their schools have a computer lab.
- 32 teachers and 2 Head teachers (40%) indicated that they have the overhead projector to project lessons in the classroom or in the computer lab but 48 teachers and 3 Head teachers (60%) indicated that they did not have an overhead projector. This is part of lack of resources.
- 64 Teachers and 4 Head teachers (80%) indicated that their schools do not have internet connection while 16 teachers and 1 Head teachers (20%) indicated that their school has internet connection, following this result, the researcher finds that the majority of respondents do not have an internet connection, which can be considered as a challenge as well.
- 22 (27.5%) teachers use a computer and Word software, 13 (16.2%) teachers use a computer and Word-PowerPoint software in teaching and learning in the classroom or computer lab, while that 45 (56.2%) of the respondents do not use the ICT tools, with this result, the research finds that the majority of teachers still use the traditional system that to use ICT in teaching and learning, this makes part of the challenges.

According to a European study by Empirica (2006), lack of access to resources is the main obstacle and teachers reported various

problems related to the use of ICT in education (e.g. Lack of computers and lack of adequate equipment). In this study, the researcher finds that there is a lack of resources in these schools, which is seen as a challenge in using ICTs.

3.4. Skills and Use of ICT by teachers

Teachers were asked to assert their ICT skills and knowledge in teaching and learning on several points of pedagogical practices and to indicate whether they had sufficient time to use ICT in their teaching practices.

Below are the results of teachers' current knowledge and skills in the use of ICT tools. It is found that 10 (12.5%) of respondents have excellent computer skills, 6 (7.5%) are very good, 35 (43.7%) are good and 29 (36.2%) respondents do not have skills. Regarding the use of the Word software: 19 (24.3%) respondents have excellent skills, 14 (17.5%) are very good, 16 (20%) are good and 28 (35%) do not have skills; 10 respondents (12.5%) are excellent, 8 (10%) are very good, 10 (12.5%) are good and 52 (65%) are not competent. In addition, for the use of PowerPoint, only 14 (17.5%) of respondents with excellent skills, 16 (20%) of respondents are very good, 8 (10%) of respondents are good and 42 (52.5%) respondents do not have skills. Regarding the use of e-mail, 10 respondents (12.5%) have excellent skills, 15 (18.75%) are very good, 12 (15%) are good and 43 (53.7 %) do not have skills whereas on Internet use (Online training and search for lessons on the internet), only 12 (15%) of respondents who have excellent skills, 8 (10%) of respondents are very good, 17 (21.2%) of respondents are good and 40 (50%) of respondents do not have skills. In terms of knowledge and skills related to the use of the overhead projector, only 10 (12.5%) of the respondents who have excellent skills, 2 (2.5%) are very good, 8 (10 %) are good and 59 (73.7%) respondents do not have skills. Finally, the use of television as part of education, 57 (71.2%) people with excellent skills, 14 (17.5%) are very good, and 8 (10%) are good and 1 (1.2%).

With such a result, the researcher finds that it is clear that teachers do not currently have the appropriate knowledge and skills to effectively use ICTs in teaching and learning, relying on the literature review of this study. In the report produced by Empirica (2006) on the use of ICT in European schools, the data used for this report come from the survey of heads of schools and class teachers in 27 European countries. The results show that teachers who do not use a computer in the classroom report that "lack of skills" is a limiting factor that prevents them from using ICT to teach. Teachers all need knowledge and pedagogical skills to know how to integrate information and communication technologies into their teaching practice.

3.5. Use of ICTs in Teaching process

Respondents indicated their frequency of use: Only 2 (2.5%) respondents who indicated that they use every day, 6 (7.5%) respondents sometimes use, 19 (23.7%) respondents use 1 to 3 hours per week, and 19 (23.7%) respondents reported that they rarely use while 34 (42.5%) do not use technology information and communication in teaching and learning, but they only use their traditional educational system. The frequency of use of ICTs in teaching and learning: Mean (3.74) and a Standard Deviation of (1.008).

3.6. Frequency of ICT use in activities

Teachers were asked to indicate the frequency of use of Information and Communication Technologies in educational activities by choosing the answer corresponding to the activity requiring Information and Communication Technologies, it was sufficient to choose among these assertions: (A = Never , B = Rarely, C = Sometimes , D = Often , F = Always).

Frequency of ICT use in activities

Activities	A (%)	B (%)	C (%)	D (%)	F(%)	Mean	St. Dev.
Use tutorials to self-train	39.2	23.0	10.8	9.5	17.6	3.57	1.518
Use email to communicate with other teachers, parents and other	66.2	2.7	8.1	4.1	18.9	3.93	1.625
Use a projector connected to a computer in class	56.8	6.8	16.2	9.5	10.8	3.89	1.448
Create PowerPoint presentations for use in class	56.8	8.1	8.1	12.2	14.9	3.80	1.570
Keep track of student grades or notes in the computer	31.1	8.1	13.5	18.9	28.4	2.95	1.638
Prepare documents, lessons, tests / quizzes and homework for students	37.8	25.7	14.9	9.5	12.2	3.68	1.386
Have students play computer games (in class or computer lab)	24.3	23.0	8.1	20.3	24.3	3.03	1.552
Ask students to experiment or exercise on the computer (classroom or computer lab)	24.3	8.1	6.8	14.9	45.9	2.50	1.682
Use digital video, digital cameras	20.3	5.4	2.7	18.9	52.7	2.22	1.607
Join an online discussion forum	75.7	2.7	9.5	8.1	4.1	4.38	1.190
Search for lessons on the Internet	55.4	12.2	6.8	9.5	16.2	3.81	1.567

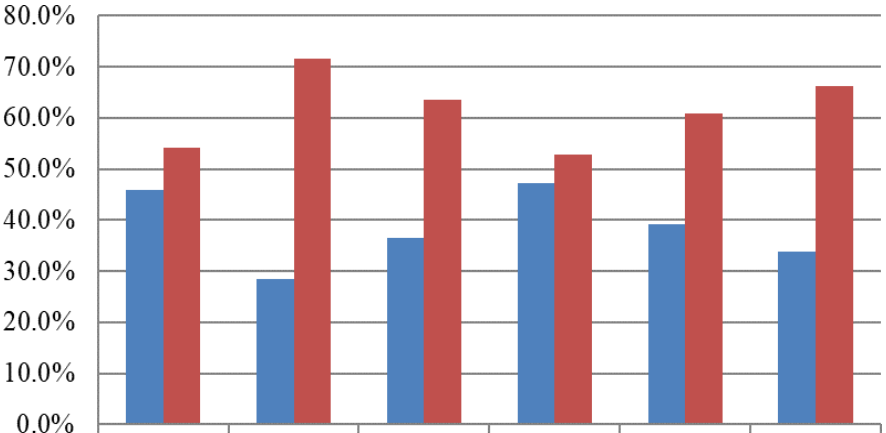
Follow the training on the platform of the in-service training of teachers	68.9	2.7	8.1	9.5	10.8	4.09	1.463

The table shows the frequency of use of information and communication technologies in some educational activities by teachers in the educational province of Mont-Amba. The results show that ICTs are not used completely by teachers, something that is very worrying because, like a fully digital world, a teacher does not adopt these technologies which are of paramount importance in the classroom while they improve the quality of teaching and learning.

3.7. Teachers Training on the use of ICT

The participants were asked about the organization of training courses on the use of information and communication technologies that are organized to teach them how to integrate these technologies into their teaching practice. 38 respondents (47.5%) confirmed that the school or the Ministry of Primary, Secondary and Professional Education organizes training sessions but it is not permanent, and 42 respondents (52.5%) answered negatively that neither the school nor the Ministry of Primary, Secondary and Professional Education organizes any training to train them on the use of ICT in their pedagogical practice. In addition, the head teachers who were interviewed, they pointed out that this lack of permanent training sessions on the use of ICT hinders the professional development and performance of teachers because they do not know how to use the technologies that have become essential in today's digital world. The training organization has a Mean of (1.53) and a Standard Deviation of (.503).

Trainings received by Participants (Teachers)



	Word	Excel	PPT	Computer	Internet	FOAD-DRC
Yes	45.9%	28.4%	36.5%	47.3%	39.2%	33.8%
No	54.1%	71.6%	63.5%	52.7%	60.8%	66.2%

This graph shows the trainings that teachers have received to acquire knowledge and skills on the use of information and communication technologies. It is clear that the respondents received five trainings in the context of the use of information and communication technologies which are presented as follows: Using the Word software: 45.9% of respondents received training, 54.1% did not take this training on the use of Word software (Mean: 1.54 /SD: .502); Excel: 28.4% of the respondents received the training while 71.6% did not take this training (Mean: 1.72 / SD: .454); PPT: 36.5% of respondents received training while 63.5% did not take this training (Mean: 1.64 / SD: .485); Computer: 47.3% of respondents received training while 52.7% did not take this training (Mean: 1.53 / SD: .503); Internet: 39.2% of respondents received training while 60.8% did not take this training (Mean: 1.61 / SD: .492); lastly, a continuous training of teachers on the FOAD-RDC platform: 33.8% of the respondents received the training while 66.2% did not follow this

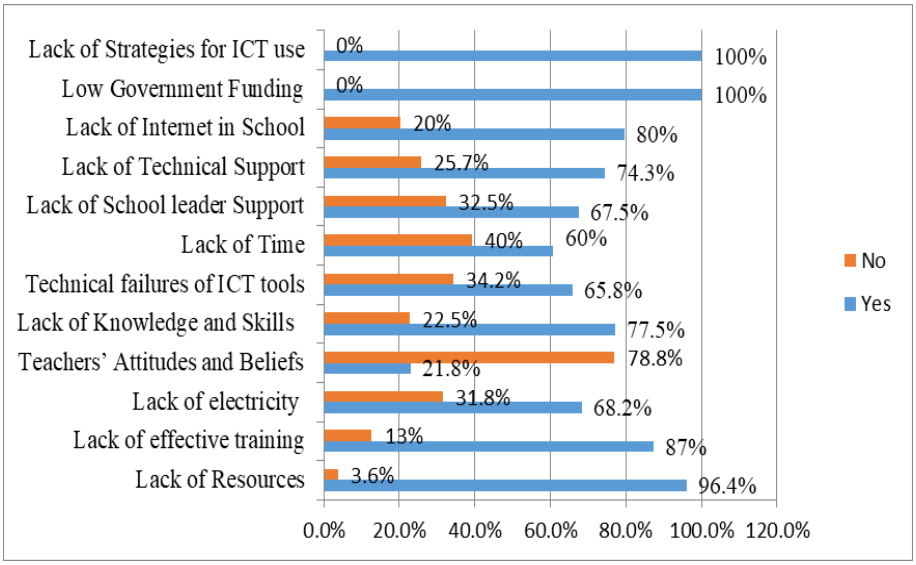
training in the use of the FOAD-DRC platform (Mean: 1.66 / SD: .476).

In view of this result of the trainings that participants received, it is clear that there is a lack of better teacher training, according to Özden (2007), recent research in Turkey has shown that the main problem of new ICTs in education was due to the lack of in-service teacher training, as well as the results of Basak and Govender (2015) the lack of effective ICT training is one of the challenges with the use of ICT in teaching. This is part of one of the challenges to using ICTs in primary schools in the Mont-Amba Educational Province.

3.8. Barriers in using ICT in teaching process

In this section, the researcher had formulated survey questions that synthesized the barriers that teachers might encounter when using ICTs in teaching and learning, and made it easier for teachers to provide data on the obstacles. In addition, the head teachers also had this question during the interview to provide the researcher with additional information in relation to the information provided by the teachers, as they are the school leaders and may also have necessary information that can enrich this research.

Barriers to using ICT in teaching and learning



This graph shows the different barriers that hinder the use of ICTs in teaching and learning in schools in the educational province of Mont-Amba, this is the result of data provided by teachers and head teachers:

- 77 teachers and all 5 head teachers (96.4%) confirmed that the lack of resources (insufficient) is a major obstacle to the use of ICTs in teaching learning in their schools, and only 3 teachers (3.6%) who did not report this problem. With this confirmation from the respondents, the researcher also sees as a big challenge to the use of ICTs because without the necessary resources, the use of ICT will not be effective (Mean: 1.04 / SD: .192).
- 70 teachers and 4 head teachers (87%) indicated that lack of effective training is a barrier to ICT use as teachers do not receive effective training on the use of ICT in teaching and learning, while that 10 teachers and 1 head teacher (13%) did not report this as an obstacle for them, but according to the

researcher, this has a strong influence on the knowledge and skills of the teacher in the context of the use of ICT, and its professional development (Mean: 1.13 / SD: .335).

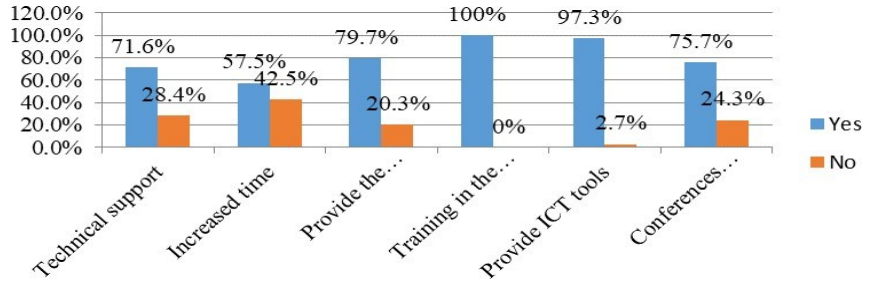
- 53 teachers and all head teachers (68.2%) confirmed that the lack of electricity is a huge barrier to the effective use of ICT while 25 teachers (31.8%) did not report this problem as an obstacle to them (Mean: 1.32 / SD: .468).
- 17 teachers (21.2%) indicated that they do not trust ICT tools, while 63 teachers (78.7%) did not report this attitude, and during the interview, all head teachers confirmed that teachers are ready to use ICT in their teaching practice but it is only the obstacles that prevent them from using ICT, with the result that the researcher can confirm that the majority of teachers are ready to use ICTs, this is considered as a positive attitude of teachers (Mean: 1.77 / SD: .424).
- 62 teachers (77.5%) confirmed that the lack of knowledge and skills on the use of ICT is a barrier for them, and 4 head teachers confirmed this in the interview, while 18 teachers (22.5%) and 1 head teacher did not report this problem. With such confirmation from the respondents, the researcher also confirms that the lack of knowledge of teachers is a major barrier to the effective use of ICT in these schools, it is a challenge (Mean: 1.23 / SD: .422).
- 51 teachers and 5 head teachers (65.8%) confirmed that technical failures are an obstacle to their effective use of ICTs as ICT tools in the computer lab room fail regularly, but 29 teachers (34.2%) did not report this problem as the obstacle for them (Mean: 1.34 / SD: .477).
- 48 teachers (60%) confirmed that the lack of time to use ICT is an obstacle for them, while 32 teachers (40%) do not constitute an obstacle for them (Mean: 1.61 / SD: .492).
- 54 teachers (67.5%) confirmed that lack of support from the school leader is a barrier for them 26 teachers (32.5%) confirmed that they receive support from their leaders to use ICTs in teaching and learning (Mean: 1.68 / SD: .471).

- 55 teachers (74.3%) confirmed that a lack of technical support is an obstacle for them, but 19 teachers (25.7%) receive technical support (Mean: 1.74 / SD: .440).
- 64 Teachers and 4 Head teachers (80%) indicated that their schools do not have internet connection while 16 teachers and 1 Head teacher (20%) indicated that their school has internet connection, following this result I notes that the majority of respondents do not have the internet connection, which the researcher also sees as a challenge (Mean: 1.80 / SD: .404).
- All 5 head teachers (100%) said that there is low government funding for their operation so this is an obstacle for them to implement ICT effectively, and in my opinion, this is a major challenge the use of ICTs as ICTs require the finance necessary for effective implementation (Mean: 1.00 / SD: .000).
- All 5 head teachers (100%) said that there is a lack of a strategy and policy of using ICT in teaching and learning, according to the researcher, with such a result, this lack of strategy and policy of use of ICT is already an obstacle to the effective use of ICTs in teaching and learning (Mean: 1.00 / SD: .000).

Teachers in these schools face several obstacles as Werner and Tobias (2007) have also pointed out that the obstacles to successful ICT integration include teachers' lack of trust, lack of teacher skills, lack of effective training, resistance to change and negative attitudes, lack of technical support and lack of infrastructure. Similarly, according to the results of Siri and Shang (2018), Secondary school teachers in Sweden also faced several challenges related to the use of ICTs such as lack of resources, lack of confidence in ICT tools, lack knowledge and skills, lack of time and technical support.

3.9. Suggestions from teachers

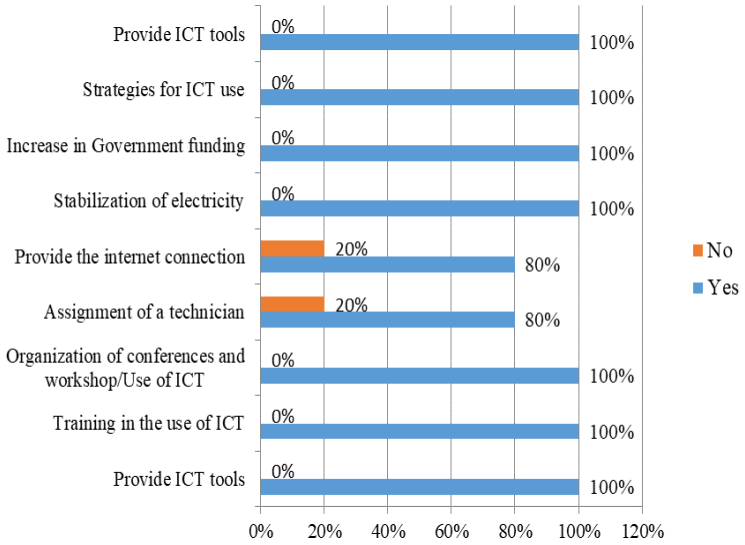
In the last part of the questionnaire, the respondents were given the opportunity to submit their suggestions according to their opinion to facilitate the effective use of ICTs in teaching and learning.



This graph shows the suggestions made by teachers for the effective use of ICTs in teaching and learning in their schools, suggestions are: Provide ICT tools Train the use of ICT in teaching and learning, provide the internet connection, organization of conferences and workshop on the use of ICT, technical support, increase in the time of use of ICT.

3.10. Suggestions from head teachers

The final part of the interview was about suggestions that Head teachers could make to the researcher based on their opinion that will enable the effective use of ICTs in teaching and learning in their schools.



This chart presents the suggestions made by head teachers for the effective use of ICTs in teaching and learning in their schools. These suggestions are as follows: That the government provides their schools ICT tools, ongoing teacher training on the use of ICT in teaching and learning, regular organization of conferences and workshops on the use of ICT, Assigning a technician to the school for technical assistance to teachers, providing the internet connection to their school, stabilization of electricity to enable them to use ICT effectively, and increased government funding for teacher motivation and other school expenses.

4. Conclusion

This study set itself as the main objective of investigating the challenges for using ICT in teaching process by primary school's teachers in Mont-Amba educational province. However, after analyzing all the data collected from the targeted respondents who participated in this study, it should be noted that the realization of this research is very important because it highlights the challenges related to the use; these results that come after the data analysis meet the

specific objectives of this research because the results show that teachers in this educational province face several obstacles that hinder the effective use of ICT in their teaching practice. We cited:

- Lack/ insufficiency of Resources
- Lack of internet connection in schools
- Lack of knowledge and skills in using ICT
- Lack of effective training on ICT use in teaching and learning
- Lack of technical support and technical failures of ICT tools
- Lack of support from the school leader
- Lack of Time
- Lack of electricity
- Low Government Funding
- Lack of Strategies for ICT use

It should be noted that this study faced some limitation; small number of respondents with a very small number of schools. The sample is not fully representative of all teachers in schools in the Mont-Amba educational province because the province is full of several elementary schools. All this was due to the time allotted for the research. As a result, I have not been able to involve many teachers and principals who are more interested in the realities of many elementary schools, but this is a palpable reality according to the data provided by the target respondents. In addition, the knowledge and computer skills of those who participated in this study may vary from one moment to another and from one school to another, which can distort the results of respondents at different levels of perspective on the challenges of using ICTs in primary schools.

5. Policy Recommendations

According to the results of the study, the Congolese Government, educational authorities, teachers, parents and all education partners in the Democratic Republic of the Congo are recommended to implement the recommendations proposed by this study for integration and the effective use of information and communication technologies in teaching and learning to improve the quality of teaching and learning, so that primary school students can benefit from quality education as soon as they enter primary school, as

these technologies will enable teachers and students to adapt throughout their lives in this currently digital world.

5.1. For the DRC Government

- Increase in the budget allocated to the education sector to enable this sector to meet the main needs for improving the quality of teaching and learning (E.g. motivation of teachers, computerization of schools…);
- Equip all schools with the computer, multimedia and electrical resources (computers/Tablets, overhead projector, printer, sound amplifier, inverter ...);
- Signing of a memorandum of understanding between the Government and the telecommunication companies in order to put in each school the internet connection at a very reduced cost that will allow schools to benefit from the internet connection and to easily pay their bills ;
- The Congolese Government with its national electricity company must put in place a "Zero School without Electricity" strategy so that all schools are electrified to enable them to use ICT successfully, without any difficulty Electric power. In addition, an alternative solution can be considered, the use of renewable energy 'solar energy' 'Solar Panel' 'with high capacity batteries'. The need for electricity is mandatory because it will allow permanent access to ICT in schools.
- Reprocess all older teachers and recruit qualified young teachers to use ICT tools as teaching materials.

5.2. For the Authorities of the education sector

- Revise the curriculum to adapt it to current realities with the innovations and contributions of ICT in teaching and learning as this ICT improve the quality of teaching and learning.
- Put in place a more effective national policy/strategies of ICT use according to the realities of each part of the country for effective integration of ICT in teaching and learning;

- Require educational schools and universities that train future teachers to effectively strengthen the initial training of the future teacher with a thorough knowledge and mastery of the use of ICT tools in teaching and learning;
- Integrate ICT knowledge and skills in the conditions of access to the profession of teachers when recruiting new teachers to make effective changes that will enable teachers to be qualified and able to use ICT in their teaching practices.
- Create a commission of ICT Inspectors who will evaluate monthly or quarterly the performance of teachers on skills and knowledge of the use of ICT in their teaching practices as this will encourage them to be more efficient.
- Engage and assign a maintenance officer in each school who will provide technical support in the school so that teachers no longer abandon the use of ICT due to technical breakdowns.
- Create a Network of Neighborhood Schools that will bring together a number of neighboring schools on a monthly basis and allow them to share experiences and challenges teachers face while using ICT, and report back to the local authorities Education sector (Central administration) on the evolution of the use of ICT in teaching and learning to provide effective support for the sustainability of ICT use.
- Organize workshops, seminars, conferences and regular training sessions for all teachers on the use of ICT in teaching and learning.

5.3. For School leaders

- Motivate and Provide necessary support to teachers for the effective use of ICT in teaching and learning.
- Revise the school's time to allow teachers enough time to fully use ICT and successfully.

5.4. For Teachers

- Teachers must agree to change their traditional teaching and learning system to use ICTs that will improve the quality of teaching and learning.

- Teachers must agree to participate in conferences, workshops and training sessions to acquire the knowledge and skills required to integrate and use ICT effectively in their teaching practices.

5.6. For Parents and other partners in education

- Motivate schools with their teachers to use ICT in teaching and learning successfully.
- Support schools in the vision of the effective use of ICTs with all the necessary supports (e.g. Purchase of educational tables for their children, etc.) to facilitate the effective use of ICT in teaching and learning which will contribute to improving the quality of children's education.

References

Albirini, A. (2006). Teachers‟ attitudes toward information and communication technologies:he case of Syrian EFL teachers. *Computers & Education 47 (2006) 373–398*, 1-2.

Al-Oteawi, S. M. (2002). The perceptions of administrators and teachers in utilizing information technology in instruction, administrative work, technology planning and staff development in Saudi Arabia. *Doctoral dissertation, Ohio University, Ohio.*

Basak, S., & Govender, D.W. (2015). Development of a conceptual framework regarding the factors inhibiting teachers' successful adoption and implementation of ICT in teaching and learning. *The International Business & Economics Research Journal Vol. 14 No. 3*, 431-438.

Basque, J. (2005). Une réflexion sur les fonctions attribuées aux TIC en enseignement universitaire. *Revue internationale des technologies en pédagogie universitaire*, 30–41.

Beggs, T. A. (2000). Influences and barriers to the adoption of instructional technology. *The Proceedings of the Mid-South Instructional Technology Conference.* Murfreesboro, TN.

Biaz, A., Bennamara, A., Khyati, A., & Talbi, M. (2009). Intégration des technologies de l‟‟information et de la communication dans le travail enseignant, état des lieux et perspectives. *EpiNet: revue électronique de l'EPI*, 120.

Blackwell, C. (2013). Teacher practices with mobile technology integrating tablet computers into the early childhood classroom. *Journal of Education Research (7:4)*, 231-255.

Cox, M.J, Preston, C., & Cox, K. . (1999). What Motivates Teachers to use ICT? *British Educational Research Association Conference.* Brighton.

David, & al. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 982–1003.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). *User acceptance of computer technology: A comparison of two theoretical models.*Management Science.

DRC, E. S. (2015, December). Stratégie sectorielle de l'éducation et de la formation 2016-2025. Kinshasa, Kinshasa, Democratic Republic of Congo: SPACE.

Effiong M. A. , & Bubaraye O.I. (2007). Teachers use of Information and Communication Technology (ICT) in Teaching English language in Senior Secondary Schools in Akwa Ibom State. *Equatorial Journal of Education and Curriculum Studies*.

Empirica. (2006). Benchmarking access and use of ICT in European schools 2006: Final report from Head Teacher and Classroom Teacher Surveys in 27 European countries Germany:*European Commission.*

Fenty, N., & McKendry Anderson, E.M. (2014). Examining Educators, Knowledge, Beliefs, and Practices About Using Technology With Young Children. *Journal of Early Childhood Teacher Education (35:2)*, 114-134.

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies forQualitative.* New York: Research Aldine.

Hadi Salehi , & Zeinab Salehi. (2012). Challenges for Using ICT in Education: Teachers' Insights. *International Journal of e-*

Education , e-Business, e-Management and e-Learning, Vol. 2, No. 1.

Ihmeideh, F. (2010). The role of computer technology in teaching reading and writing: preschool teachers‟ beliefs and practices. *Journal of Research in Childhood Education (24:1)*, 60-79.

Ivan Kala, t. l., Haif , E. B., Leslie, C., Ernesto, L., Diana, L., Cher, P. L., et al. (2012). *ICT in Primary Education, Analytical survey.* Paris: UNESCO Institute for Information Technologies in Education.

Jackson, S. (2009). *Research Methods and Statistics: A Critical Thinking Approach 3rd edition.* Belmont, CA: Wadsworth.

Johnson, B., & Christensen, L. (2004). *Educational Research: Quantitative, Qualitative, and Mixed Approaches (2e éd.).* Boston, MA : Pearson.

Jordan, R. P., Minerva, E.-S., & P., N. (2016). Pre-service teachers' confidence and attitude on the integration of information and communication technology in teaching in naval state university, Naval, Biliran, Philippines. *International Journal Of Engineering Sciences & Research Technology*, 815.

Khan, S. H. (2012). Barriers to the introduction of ICT into education in developing countries: the example of bangladesh. *International Journal of Instruction e-ISSN: 1308-1470*, 68.

Leung, W. (2003). The Shift from a Traditional to a Digital Classroom Hong Kong Kindergartens. *Childhood Education*, 12-17.

Liu, X., & Pange, J. (2014). Early childhood teachers‟ perceived barriers to ICT integration inteaching: a survey study in Mainland China. *Journal of Computers in Education*, 1-15.

Mingaine, L. (2013). Challenges in the Implementation of ICT in Public Secondary Schools in Kenya. *International J. Soc. Sci. & Education Vol.4 Issue 1, ISSN: 2223-4934 E and 2227-393X Print*, 229.

Mugenda, M. (2003). Research methods. *African centre for Technology studies Kenye-Nairobi*.

Mumtaz, S. (2000). Factors Affecting Teachers' Use of Information and Communications Technology: A review of the Literature.

Journal of Information Technology for Teacher Education, 9(3), 319-342.

Nikleia, E., & Despo, K. (2005). Computer based early childhood learning, in Proceedings of EUROCON 2005. *The International Conference on Computer as a Tool* (pp. 21-24). Serbia: Belgrade.

Nikolopoulou, K., & Gialamas, V. . (2013). Barriers to the integration of computers in early childhood settings: Teachers‟ perceptions. *Education and Information Technologies*, 1-17.

Orodho, J. A. (2008). *Techniques of writing Research Proposals and Reports in Education and Social Sciences,Second Edition.* Maseno, Kanezja HP Enterprises.

Osborne, J., & Hennessy, S. (2003). Literature review in science education and the role of ICT: Promise, problems and future directions. *London: Futurelab*.

Özden, M. (2007). Problems with science and technology education in Turkey. *Eurasia Journal of Mathematics, Science & Technology Education, 3(2)*, 157-161.

Pelgrum, W. J. (2001). Obstacles to the integration of ICT in education: results from a worldwide educational assessment. *Computers & Education*, 37, 163-178.

Peraya, D. , & Peltier, C. (2012). Une année d‟immersion dans un dispositif de formation aux echnologies : prise de conscience du potentiel éducatif des TICE, intentions d‟action et changement de pratique. *Revue internationale des technologies en pédagogie universitaire*, 111-135.

Perrenoud, P. (1998). Se servir des technologies nouvelles. Genève: Faculté de psychologie et de sciences de l'éducation. *Université de Genève*.

Rabah, J. (2015). Benefits and challenges of information and communication technologies (ICT) integration in Québec english schools. *The Turkish Online Journal of Educational Technology Vol. 14 No. 2*, 24-31.

Salehi, H. , & Salehi, Z. . (2012). Challenges for using ICT in education: teachers‟ insights. *International Journal of e-*

Education, e-Business, e-Management and e-Learning, Vol. 2, No. 1, 40-43.

Schoepp, K. (2005). Barriers to Technology Integration in a Technology-Rich Environment. *Learning and Teaching in Higher Education: Gulf Perspectives*, 2:1.

Serkan Unal , & Ibrahim Hakki Ozturk. (2012). Barriers to ITC Integration into Teachers' Classroom Practices: Lessons from a Case Study on Social Studies Teachers in Turkey. *World Applied Sciences Journal 18 (7)*(ISSN 1818-4952): 939-944.

Shaik Fathima M.Sc, M.A., M.Ed., & M.Phil. (2013). Challenges of Ict in Teaching Learning Process. *International Journal Of Engineering And Science Vol.2* (2278-4721).

Sicilia, C. (2005). The Challenges and Benefits to Teachers' Practices in Constructivist Learning Environments Supported by Technology. *Unpublished master's thesis, McGill University, Montreal*.

Simin G., Thanusha K., Logeswary R., & Annreetha A. (2016). Teaching and Learning with ICT Tools:Issues and Challenges from Teachers' Perceptions. *Malaysian Online Journal of Educational Technology*, 40-41.

Siri, E., & Shang, G. (2018). Understanding challenges of using ICT in secondary schools in Sweden from teachers' perspective. *The International Journal of Information and Learning Technology, Vol. 35 Issue: 1*, 43-55.

Stronge, J. (2007). *Qualities of effective teachers.* ASCD.

Unal, S., & Ibrahim Hakki Ozturk . (2012). Barriers to ITC Integration into Teachers' Classroom Practices: Lessons from a Case Study on Social Studies Teachers in Turkey. *World Applied Sciences Journal 18 (7): 939-944, 2012, ISSN 1818-4952*.

Werner , B., & Tobias , H. (2007). Benchmarking Access and Use of ICT in European Schools 2006: Results from Head Teacher and A Classroom Teacher Surveys in 27 European Countries. *eLearning Papers*, 4.

Wood, E., Specht, J., Willoughby, T., & Mueller, J.(2008). Integrating Computer Technology in Early Childhood Education

Environments: Issues Raised by Early Childhood Educators. *Alberta Journal of Educational Research (54:2)*, 210-226.

Yamane, T. (1967). *Statistics, An Introductory Analysis, 2nd Ed.* New York: Harper and Row.